633/B

BERMUDA

ANNUAL REPORT

OF THE

DIRECTOR OF AGRICULTURE

FOR THE YEAR

1957

N.S.P.
RAM
M M

COMMONWEALTH MYCOLOGICAL INSTITUTE
23 JUN 1958

BERMUDA

ANNUAL REPORT

OF THE

DIRECTOR OF AGRICULTURE

FOR THE YEAR

1957

BOARD OF AGRICULTURE, 1957.

CHAIRMAN, Lt. Col. J. C. ASTWOOD, O.B.E., E.D., M.C.P.,
(1st January - 31st July, 1957)

N. H. P. VESEY, Esq., C.B.E., M.C.P.,
(1st August - 31st December, 1957)

MEMBERS,

Messrs. C. VAIL ZUILL, Deputy Chairman.
J. B. FERGUSON.
L. R. SELLEY, M.C.P.
S. JOHN PYE.
W. T. WILSON.
E. H. SIMONS.
A. J. TERCEIRA.
J. S. HALL.
PETER J. C. SMITH.
MICHAEL DARLING.

DEPARTMENT OF AGRICULTURE, 1957.

(Civil Service List)

Director of Agriculture ..... GORDON R. GROVES
Asst. Director of Agriculture & Plant Pathologist ..... I. W. HUGHES, B.Sc.
Government Veterinary Officer ..... E. R. EARL, V.S., B.V.Sc.
Horticulturist ..... J. H. JONES
Agricultural Assistant ..... C. V. S. EARLY
Inspector of Produce ..... T. A. HOLLIS
Acting Assistant Horticulturist ..... D. WINGATE (as from 16.9.57)
Acting Clerk to Board ..... Miss J. M. CRAWFORD

(Not on Civil Service List)

Marketing Officer ..... F. C. HOLLIS
Asst. Marketing Officer ..... E. E. SHEPPARD (as from 1.12.57)
Accountant ..... Mrs. I. KELLAWAY (Acting)
Reafforestation Officer ..... D. J. MOORE
Reafforestation Superintendents .... J. E. KING, L. A. TAPSELL (as from 1.5.57)

REPORT

of

The Director of Agriculture, 1957.

The Chairman, Board of Agriculture:

I have the honour to submit a report of the Department of Agriculture, for the year, 1957.

I. AGRICULTURE in 1957.

The outstanding feature of the weather during the year under review was the unusually high rainfall. Records at the Agricultural Station show a rainfall of 77.49 inches for the year, which is about 20 inches above the average. The highest monthly precipitation was in November with 13.97 inches, while July became a close second with 13.37 inches. Only the month of April showed a rainfall of less than 2 inches, when 1.48 inches was recorded. The hurricane season passed without any serious gale-force winds, but due to the exceptionally wet weather throughout the second half of the year, the autumn crops of vegetables were exceedingly small. With these very heavy rains during the second half of the year many more cases of soil erosion were observed than in previous years.

Vegetable Production:

Despite the low yields of vegetables during the autumn months, the overall production for 1957 was only slightly below the previous year. This is shown by the business transacted at the Government Wholesale Marketing Centre. During the year under report, produce to the value of £57,000 was purchased, compared with £59,000 in 1956. Potatoes again formed the bulk of this business. They were in sufficient supply to satisfy all demands of the Colony from the 15th February to 30th September. The past two years have shown that with proper mechanization of the farm, coupled with good seed and favourable weather, the Colony can expect to produce sufficient potatoes for about 8 months of the year, but to store the crop, adequate cold storage space is essential. The continued co-operation of the Bermuda Supplies Commission, by placing embargoes on the importation of specific vegetables when local production is sufficient to supply the demand is of great help in solving an otherwise difficult marketing problem.

The Easter Lily Trade:

The acreage of Easter lilies dropped from 25 acres in 1956 to 17 acres in 1957, but it is of interest to record that the value of the flowers exported in 1957 was £34,600 compared with £30,000 in the previous year. The export of bulbs has now virtually ceased.

The lily improvement scheme initiated by this Department in 1955, under the direction of the Assistant Director of Agriculture, is beginning to take on increased importance as the commercial acreage and the quality of the bulbs continue to decline.

The original stock of 8,000 bulbs has been increased to 25,000. Each year the plots are regularly sprayed to control aphids, and all plants showing symptoms of the virus diseases are removed. It is anticipated that within the next two years this disease-free stock should reach to about 100,000 bulbs, when it is hoped, the Department will be in a position to supply growers with clean stock.

Despite the rather pessimistic views of some of the lily growers that the market for lily flowers will gradually diminish, the opinion held by members of the Department of Agriculture is that, with improved local stock, Bermuda should be able to support a small, but vigorous industry for many years to come.

Citrus Culture:

Good crops of citrus fruit were reported by most growers, but the overall yield was considerably lower than the previous year. An embargo on the importation of lemons and grapefruit came into effect on the 15th November. The lemon crop was used by the middle of January, but it is anticipated that there will be adequate grapefruit until April or May, 1958.

Although a proper marketing scheme has not yet been organised, the Bermuda Citrus Growers' Association are considering the problem seriously. The major difficulty is with grapefruit. The trees are now producing heavy crops, resulting in a production which is in excess of local requirements, but of insufficient volume to consider the export market.

The spraying programme carried out by the Department of Agriculture, while effective in the control of scale insects and rust mites was hindered throughout the summer months, due to very heavy rains. Despite this difficulty the fruit was reasonably free of rust mites.

Locally budded citrus trees are still in great demand.

Dairying:

Milk production was slightly lower than in 1956, due to a drop in the dairy cattle population. During the year the dairy farmers imported 33 heads of dairy cattle as replacements. It is, however, doubtful if the present milk production can be maintained in the future, due to land, suitable for dairy farming, being absorbed in housing estates, playing fields and parks. While the need for houses and playing fields cannot be denied, dairy farming will obviously be one of the local agricultural enterprises to suffer from these developments.

Poultry:

Egg production has again slightly increased. It is estimated that locally produced eggs amounted to 450,000 dozens in 1957. This is 50,000 dozen more than in the previous year.

It is of interest to record that the old Naval Hospital at Ireland Island continues to be used to house some 25,000 laying birds.

The production of poultry meat has also been maintained throughout the past year. More locally produced turkey meat is appearing on the market during the months of November and December, sold at prices which compare very favourably with the imported article.

The seventh Annual Poultry Show was held in January, under the auspices of the Bermuda Poultry Fanciers' Society, when the usual high quality birds were on exhibition.

Other Animal Products:

The Government Veterinary Officer's Report for 1957 shows that he inspected in the slaughter houses, 1,638 carcasses of pork, 228 of veal and 195 of beef.

Local honey finds a ready market in Bermuda, but unfortunately the interest in apiary culture is on the decline.

II. REAFFORESTATION SCHEME — PARKS DIVISION.

Good progress was made throughout the year in the various operations undertaken within the Parks Division. The Board of Agriculture agreed to invite tenders for the maintenance of the Wayside Parks. The contract was awarded to the Bermuda Landscaping Company, Limited, with effect from the 1st April. This undoubtedly helped the Department a great deal, because it released the reafforestation workers from the mowing of grass, for other work connected with the division. As from the 1st January, 1957, the school playing fields, previously maintained by the Department of Education, were turned over to the Department of Agriculture. Tenders were likewise invited for the upkeep of these fields. A contract for the whole year was awarded to Mr. Norman M. Moniz, of Smith's Parish. The Department of Agriculture is now responsible for 54 separate areas of Government land, which are being maintained as parks or school playing fields.

Felling Dead Trees:

Further progress was made in the felling of dead trees. By the close of the year, the second fifty feet of clearance had been completed on all the main roads. Most of the Government land has been cleared in St. George's. There remains, however, Government land on Ireland Island and the Prospect area where there are a large number of trees to fell; in addition, a number of estate roads have not been completed. Some 14,133 trees were felled during the year.

Planting:

Emphasis was again placed on planting the cleared areas. Over 9,000 plants were used in the many planting schemes.

Maintenance of Roadside Planting and Hedges:

The upkeep of the roadside plantings and hedge trimming is a major operation of the Parks Division. It is difficult to maintain the hedges in a condition which will not impede the safe passage of traffic, and at the same time, allow the plants to produce their flowers. Unfortunately, the bulk of the hedges are of oleanders, and these were planted much too close to the edges of the roads. This, of course, was done in the days when the mode of transportation was nothing faster than horse-drawn vehicles and push bicycles. Nowadays, with the heavy motorization, the pleasing oleander hedges are a menace to traffic.

Cases of vandalism are still being observed along the road sides, and owners of cattle and goats persist in tethering these animals to the plant guards. As a result, the guard is either pulled up or broken and the plant destroyed.

Wayside Parks:

The wayside parks are developing on satisfactory lines. Most of the trees, shrubs and palms are becoming well-established, and the general condition of these parks is good. Plantings at Spittal Pond, for instance, are beginning to show up very effectively. In the initial work in this area, a considerable number of the plants perished, but subsequent plantings have become firmly established. Casuarinas and Bay Grapes predominate in this area, but some good specimens of **Juniperus silicicola** are to be found in the more sheltered places. This area can be further developed, which will ultimately give good protection to the wild bird life, and will stand out as one of the unspoiled open spaces. Several other areas along the South Shore Road, are under development, and still more are contemplated.

III. ENTOMOLOGY AND PLANT PATHOLOGY.

The following summary of the reports of the Assistant Director and Entomologist gives some indication of the detailed investigations carried out during the year.

Biological Control of Insect Pests:

The Commonwealth Institute of Biological Control continued investigations of the two scales attacking local oleanders, namely, the oleander scale, **Pseudaulcapsis pentagona** Targ, and the green shield scale, **Pulvinaria psidii** Shrank. Dr. F. J. Simmonds made three visits to the Colony in connection with this work and submitted detailed reports on his findings. As was the case in 1956, the main effort was directed at finding suitable parasites and predators to control the scales on oleanders. Attempts were also made to exert some control on the local lizard population and in so doing limit the harmful effect which the lizards are thought to have been having on beneficial insects (particularly **coccinellids**). It was in this connection that the Fly catcher, **Tyrannus sulphuratus**, or "Kiskadee", as it is known in Trinidad, was introduced into Bermuda during the year.

One hundred and twenty four shipments of beneficial insects and birds were received throughout 1957. These consignments included **Telsinia nigra** Weise, and **Scymnus hareya** Weise from Japan, and **Coccophagus bogoriensis** Kon came originally from India, but were bred in California, **Coccinellids**, and the birds from Trinidad. It is of interest to record that colonies of **Azya orbigera** and **Cryptolaemus montrousi** Mule, liberated on the green shield scale have now remained active for more than two years in certain areas. Both species are capable of controlling green shield scale in localized situations, but neither species seem to move far from the point of original liberation, and for this reason, they may not become economically useful. The kiskadees now appear well established, but it is not yet

known if they will breed here or how they will weather the winter temperature. They have been observed eating a variety of large insects, but only an occasional bird has been seen to devour a lizard. Just how effective they will become as a control for the lizards remains to be seen.

Chemical Control:

The Mediterranean fruit fly has been a pest of major importance in the Colony for a great many years. It has made the growing of peaches virtually impossible, and in recent years has been causing a severe loss to the citrus growers. In 1956, fruit fly damage was recorded in more than 25 orchards, and in many of these orchards almost the whole crop was lost as a result of attacks by the pest. Attempts to control the fruit fly with poison sprays, sweetened with sugar, proved ineffective. During the early part of 1957, information was gathered on the practices which were being employed in Florida to eradicate the fruit fly. It was decided an all out effort would be made to collect data on the local population trends of the fly and to work out control measures, utilizing the new bait sprays, which were proving so successful in Florida.

Fifty plastic traps were obtained for this work. They were baited with angelica seed oil, with 3% DDVP added as a toxicant. The traps were placed in orchards in which fruit fly damage had been recorded in the previous year. Trapping was started in March and carried on throughout the remainder of the year. While individual traps often caught as many as two hundred flies (all males) per day, and very probably had a significant effect as a control measure, the main purpose of the traps was to yield information on population trends and to measure the effectiveness of the poison bait sprays which were being applied. The bait spray contained malathion 25% wettable powder as the toxicant and protein hydrolysate (Staley's sauce bait No. 2) as the attractant. Application was made with both high and low volume equipment. Spraying was carried out at 8 to 10 day intervals and the trees were given only a slight spraying to avoid possible phytotoxic effects from the somewhat acid bait.

In summarizing the work on the fruit fly, the Assistant Director continues:

"There appears to be a critical period as far as damage to citrus is concerned from the middle of July until the end of September. During that time there are a great many fruit flies about as a result of the population build-ups on the Surinam cherry. At the same time there is very little host material available since the cherries have by that time started to disappear. Consequenly the fruit flies turn their activities to partially matured citrus. In most cases the immaturity prevents the development of most of the fly eggs. However, the numerous "stings" inflicted will bring about immature ripening, fruit drop and subsequent break-down of the fruit. This happened in three large orchards, which did not receive bait sprays during the months of June, July and August. Fruit in these orchards was heavily "stung" and a tremendous amount of fruit drop occurred. (Several oranges which were examined had received over one hundred "stings"). A continuation of the thorough trapping system, coupled with carefully timed bait sprays during the critical summer months appears to offer a solution to the fruit fly problem, because no damage of any significance was recorded in any of the orchards which were sprayed regularly from the beginning of May".

Spraying Service:

During the year under review, 150,000 imperial gallons of spray were applied to citrus, farm crops and ornamental plants. The two large spraying machines were fully employed in this work. The citrus spray schedule proved successful, despite the handicap of heavy rains during the summer and autumn months.

Fruit was, for the most part, free from rust mite damage, but there was some build-up of soft scale during the later part of the year. There are now over 500 growers included in the spray schedule.

Some difficulty was experienced to accommodate all of the farmers who rely on the Department to do their spraying for them. A few years ago the only crops which the Department was asked to spray were potatoes and tomatoes. This made the task relatively simple, since similar sprays could be used for both crops. Now a wide variety of crops must be treated, necessitating the use of many different insecticides and fungicides. However, the farmers seem well satisfied with the service.

Land Crab Control:

The investigations started by Mr. A. G. Dustan in the control of the Land Crab, **Gecarcinus lateralis** (Ferminville), were continued in 1957. The following bait was adopted and recommended in a leaflet published in April:

Bran	20 lbs.
Dieldrin (50% w.p.)	½ "
Salt	½ "
Water	3½ gallons.

A level tablespoon of this bait per hole was recommended and gave an average mortality of 98 per cent. Twenty pounds of the bran bait cost 48/- and treated 4,000 holes, or 18 holes per 1d. Broadcasting the bait in the field was experimented with, but although a certain percentage of the crabs were killed, the mortality was not sufficiently high to be practical. Further tests will be made on this method.

Correction of Chlorosis ("yellowing"):

Chlorosis a "yellowing" of the foliage of many trees and shrubs is commonly seen throughout Bermuda. The "yellowing" of citrus and hibiscus have been causing considerable concern. As a result, Mr. A. G. Dustan extended his investigations of this matter in an effort to find some chemical or chemicals which would correct this condition, when applied to the root or sprayed on the foliage.

Mr. Dustan reports that:

"In general, the results were disappointing. In no instance was it found that a single element, when applied to a "yellowed" citrus orchard, corrected the condition. It is felt that different trees in an orchard require different treatment. Of the chemicals applied in our tests, iron, manganese, and magnesium, were the ones which most frequently produced results. Probably the answer to this problem is the use of nutritional sprays which contain several minor elements.

In the work with hibiscus the addition of iron or phosphorus frequently caused improvement. In most cases the correction was not complete, but certainly a reduction in chlorosis was evident. These elements should be further tested in the spring and summer months, when the plants are growing more actively and when assimilation of plant foods would be more rapid and complete.

Some time was devoted to studying "yellowing" of casuarinas which has caused considerable concern in past years. As intimated in earlier reports, it is felt that this condition is nutritional and caused by an insufficiency of the proper plant foods. A series of experiments was set up, in co-operation with the Reafforestation Officer, in which trees exhibiting "yellowing", were treated with such organic matter as compost, castor pomace and peat moss, fortified with sulphate of ammonia and 5-10-5 fertilizer. The idea was not to correct current "yellowing", but to prevent "yellowing" the following year. The results of these tests will be watched with interest."

Herbicides:

Work was continued by both the Assistant Director and Mr. A. G. Dustan on herbicides. Weeds under special investigation were **Oxalis** spp., "guinea grass", **Panicum maximum** Jacq., "Wireweed", **Sido carpinifolia**, "nut grass", **Cyperus rotundus.**

In the case of **Oxalis** spp., Kuron in 1% and 2% strengths gave at least 90% control, and amino triazole was even better. With these materials, nothing of the bulbs remain, which was the aim of the experiment. Dowpon was outstanding in the work with the control of guinea grass, and sodium chlorate, 1 pound to 1 gallon of water gave complete kill in small field tests of the wireweed. Another spray, Esterion, 245, 2% strength also looked promising. It appeared to have no adverse effect on grass, while sodium chlorate killed anything. Nut grass was successfully controlled in lily fields through the use of a 1% Kuron spray. The treatments were made approximately three weeks before the first lilies emerged. A high volume sprayer was used in making the applications, and a spreading agent was added to the spray mixture. Complete death of the nut grass was recorded in three weeks. There was no harmful effect on the lilies.

IV. HORTICULTURE.

The horticultural activities of the Department were considerably increased during 1957. This was made possible by the work of two trained Horticulturists, namely Mr. J. H. Jones, and Mr. D. J. Moore, who hold the posts of Horticulturist and Reafforestation Officer, respectively. Great opportunities exist, especially now that two other properties are available as sub-stations. The Potters Field area in Devonshire, is being developed as an arboretum, and the old kitchen garden at Admiralty House, turned over to the Department in April, is being made into a plant nursery. Further development is planned at the Agricultural Station, which it is hoped, will be re-named the Botanical Garden in the near future. With these three establishments, and the extensive work of the Parks Division a far greater emphasis must now be placed upon the horticultural activities of the Department.

Nursery Work, including Citrus Propagation:

The plant nursery is well stocked with a large variety of trees, shrubs and palms. Many new species are being tried from various regions of the world. During 1957, 24,455 plants were sent out from the plant nursery. Nearly 10,000 of these were used in the Parks Division. The remainder were either sold to the general public or donated to Arbour Societies and similar organizations. In addition, 1067 budded citrus trees were sold.

The propagation of citrus involves a great deal of labour, but it is considered a very worthwhile project, and will be continued as long as the demand for young trees continues.

Advisory Service:

The horticultural advisory service is possibly one of the most outstanding features of the Department's work. Numerous requests are received for advice and these are carried out as expeditiously as possible. Many of the calls are in connection with landscaping problems, of the new housing estate developments. Although the results are not readily apparent, ultimately this type of service will be invaluable to the Colony as a whole.

School Gardening:

The Horticulturist conducted gardening classes in several schools during the year. St. George's Secondary School received special attention, and there the results were very encouraging.

Arbour Societies:

Assistance has been continued to the Arbour Societies. In the Parishes of St. George's, Hamilton, Smith's, Paget, Warwick, Southampton and Sandys, these Societies have been quite active. Plants were provided, free of charge, and in some cases additional labour supplied. In Hamilton, Smith's, Warwick and Sandys Parishes, definite projects have been undertaken and maintained in good condition.

V. ANIMAL HUSBANDRY.

Control of Animal Diseases:

The Government Veterinary Officer reports that of the 1,068 heads of dairy cattle tested for Tuberculosis in 1957, no animal reacted to the test. In 1955 there were eight reactors. It is, therefore, pleasing to report that the herds proved to be free of Tuberculosis during the year under review. It is further revealed that of the carcasses inspected in the slaughter houses, only one tubercular lesion was seen in a very old cow which had been slaughtered for dog meat.

In the case of Bang's disease 140 calves and 15 adult animals were vaccinated with strain 19 Brucella abortus vaccine.

Although hog cholera was definitely diagnosed on one farm where 10 pigs were lost, (which were being fed on un-cooked swill), none of the carcasses passing through the slaughter houses showed any symptoms of cholera. A total of 755 pigs were vaccinated with an anti hog cholera serum during the year.

Infectous pododermatitis, foot rot, was observed in several dairy herds. This disease is caused by a soil borne organism. Overcrowding of land with cattle and injury to the feet are indirect causes, and such conditions should be avoided. It is also thought that the same organism is responsible for the abscesses found in the heads of pigs in the slaughter houses, for associated with the abscesses are punctures of the mucous membrane of the mouth, which could be caused by the pig chewing sharp pieces of wood or other foreign material, creating a wound into which the pododermatitis organism may start infection.

Improvement to Livestock:

No dairy farmer applied to the Board of Agriculture for assistance to import a pedigree bull in 1957, but 33 cows were imported by individual farmers.

VI. WHOLESALE MARKETING CENTRE.

Produce to the value of £57,000 was purchased by the Wholesale Marketing Centre, which was £2,630 below the 1956 record figure. The potato crop of 24,422 bushels was 4,200 bushels less than the previous year.

The following table shows the actual value of the purchases made each year since the introduction of the Planned Production and Marketing Scheme in 1949:

1949	£16,585
1950	£24,392
1951	£34,075
1952	£38,644
1953	£34,553
1954	£33,726
1955	£47,326
1956	£59,630
1957	£57,000

Some improvement was noted during the year in the preparation of produce for the market, but still more supervision is needed, on the part of the farmer when the employees are harvesting the vegetables for delivery to the market.

Two stall holders operated the retail section of the market throughout the year.

VII. AGRICULTURAL EXHIBITION.

The twenty-second Agricultural Exhibition was held on the 10th, 11th and 12th April. This event proved to be the Department's most outstanding function of the year, and was in some respects better than the Exhibition held in 1956. By making the Exhibition an annual event, the interest and enthusiasm has been well maintained as shown by the following table:

Year	Exhibitors	Entries	Paid Admissions
1955	305	2,000	9,957
1956	385	2,450	14,400
1957	391	2,486	10,500

Floral Pageant:

The Department of Agriculture again entered a float in the Bermuda Chamber of Commerce's Floral Pageant, held in April. The float depicted a map of Bermuda made with vegetables. The lighthouses were represented by bottles of milk, and eggs were used to show the reefs. Flowers of blue and white statice were used to form the Atlantic Ocean. The whole map was framed with a border of yellow statice. This entry received the first prize in its class.

Annual Citrus and Poultry Show:

The Annual Citrus Exhibition and Poultry Show was held jointly at the Agricultural Station under the auspices of the Citrus Growers' Association and Poultry Fanciers' Society during the month of January. The Beekeepers' Association did not exhibit as in previous years.

VIII. EXTENSION WORK.

Publications:

The publication of the Agricultural Bulletin was continued throughout the year. The circulation of this Bulletin has now almost reached 600 copies per month. Other Bulletins published in 1957 include:

"Land Crabs and Their Control"	by A. G. Dustan.
"Control of Wild Onions"	" " " "
"Suggestions for the Planting of Trees, Shrubs and Palms", Bulletin No. 29.	" D. J. Moore.
"Principles of Budding and Grafting"	" J. H. Jones.
"Hints on Growing Vegetables"	" I. W. Hughes, & C. V. S. Early.

Lectures and Demonstrations:

Lectures were given by members of the Staff to various organisations including the Garden Club of Bermuda, the Parish Arbour Societies, and schools, on agricultural and horticultural subjects.

Two very successful demonstrations were given by the Horticulturist "Budding and Grafting", and "Pruning and Transplanting of Citrus Trees", at the Agricultural Station. Both of these demonstrations were exceedingly well attended.

Full advantage was taken of the time made available by the Bermuda Broadcasting Company, every second Wednesday of the month to give talks on agricultural and horticultural subjects.

IX. AGRICULTURAL STATION.

In future years, it is hoped that this heading of the Annual Report will read "The Botanical Gardens", a term which will appropriately describe the functions of the Station.

Ornamental Grounds:

It is indeed a pleasure to report that the Agricultural Station and in fact the other Government grounds, such as Government House, the Secretariat, and the House of Assembly have been maintained in first-class condition. Great credit is, therefore, due to the officers responsible for this work. Many new plants are being raised which will further enhance the already large plant collection.

While no major change was made during 1957, it is planned to move the citrus propagation work to the Pembroke nursery, in the near future, so that more space will be available for ornamental collections at the Agricultural Station.

Strawberry Trials:

The strawberry variety trials were continued in 1957, and some further interesting results were obtained.

Table 1 shows the weight in pounds of fruit gathered per rod for the three seasons. The plants being obtained from the same source in the U.S.A. each year.

TABLE 1.

Variety	1954	1955	1957
Klonmore	17.06 lbs.	31.00 lbs.	37.50 lbs.
Missionary	12.06 lbs.	24.25 lbs.	45.00 lbs.
Blakemore	11.50 lbs.	25.25 lbs.	31.75 lbs.
Tennessee Shipper	11.07 lbs.	26.00 lbs.	39.00 lbs.
Klondyke	11.00 lbs.	30.50 lbs.	17.55 lbs.
Tennessee Beauty	9.00 lbs.	24.06 lbs.	37.50 lbs.

TABLE 2.

Table 2 shows the weights in pounds per rod gathered in 1957 from the plants obtained from a second source in the U.S.A.

Variety	1957
Dixieland	52.50 lbs.
Blakemore	34.75 lbs.
Missionary	34.75 lbs.
Klondyke	28.125 lbs.
Tennessee Beauty	26.25 lbs.

All the plants used in the 1957 trial were from virus free stock.

The object of these trials was to determine if there is a variety more suitable to Bermuda than the variety, Missionary, which has been a favourite here for many years. From these results it will be observed that Missionary is still a consistently good cropper under Bermudian conditions. The variety, Dixieland, however, is worthy of further trial. In 1956 the trial was abandoned due to very dry weather. The 1954 trial also suffered from drought.

Gibberellic Acid Experiments:

Several tests were carried out by the Assistant Director to evaluate the effectiveness of the plant growth stimulant, gibberellic acid, in breaking dormancy of seed poatoes. In laboratory tests tubers were treated with solutions of gibberellic acid ranging in strength from 100 parts per million, down to .5 parts per million. The 100 ppm solutions caused excessive sprouting and a great deal of etiolation, but the 10 ppm and the 1 ppm solutions gave very encouraging results. Both of these treatments gave results which compared favourably with those obtained from treatment with ethylene chlorohydrin, (the material which is currently recommended for hastening the sprouting of potato tubers).

Field tests were also carried out to determine if the gibberellic acid treatments had any influence on yield. In the field tests the 1 and 10 ppm gibberellic acid solutions induced tubers to sprout quickly and uniformly. Higher strengths brought about spindly growth, while lower concentrations seemed to be non-effective.

Yields from the plots showed that there was no significant difference in yields from plants receiving 1 ppm and 10 ppm gibberellic acid and those receiving the ethylene chlorohydrin treatment.

Although the gibberelins have not yet been cleared by the United States' Food and Drug Administration, as being safe for use on food crops, it is expected that such clearance will be forthcoming.

A great deal more work will have to be done with this material before any conclusions can be reached as to its possible local use in this connection. However, it would be very rewarding if a way could be found to utilize gibberellic acid instead of ethylene chlorohydrin in the treatment of seed potatoes.

Grasses:

The Horticulturist has under study various grasses which may be of value for playing fields. These are **Zoysia** 52, **Zoysia Matrella, Zoysia** emerald, **Zoysia** sp., **Zoysia** strain, **Cynodon Dactylon,** and **Cynodon Dactylon** Strain.

Other Trials:

To demonstrate the variety of vegetables which flourish in Bermuda one plot was planted with all kinds of vegetables. This proved a great attraction, particularly to the tourists. The remainder of the trial plots were used chiefly to check the incidence of virus diseases in the imported seed potatoes, by planting a sample of all the seed consignments received from Canada.

X. FINANCIAL.

From the financial statement, Appendix 'B', compiled from records kept at the Department of Agriculture, it will be observed that the total allocation of funds for 1957 was £184,199, of which £175,056 was spent. Departmental receipts, including the resale of vegetables purchased through the Wholesale Marketing Centre and monies received for services rendered to the public amounted to £65,753, see Appendix 'A'. If the receipts be deducted from the total expenditure, the actual operating cost of the Department of Agriculture for 1957 was £109,303 or £55 less than in 1956. Appendix 'C' shows the actual cost of the Wholesale Marketing Centre.

XI. ACKNOWLEDGEMENTS.

In bringing this Report to a conclusion I would like to record my sincere appreciation to the Chairman, and Members of the Board of Agriculture for their valuable help and guidance throughout 1957.

To the members of the Staff of the Department of Agriculture, I likewise express my thanks for their very loyal support and the efficient manner in which they have discharged their duties. My thanks are also expressed to the numerous members of the public and especially to the members of the many organisations connected with agriculture and horticulture, from whom I have obtained much useful advice and inspiration.

Respectfully submitted,

GORDON R. GROVES,

Director of Agriculture.

25th February, 1958.

APPENDIX 'A'.

Summary of receipts for year, 1957.

Vote 2 (a)	Marketing Centre	£52,396	18 11
2 (b)	Service to citrus growers	4,789	8 9
2 (c)	Reafforestation services	3,414	9 9
2 (d)	Other receipts	5,152	11 0
		£65,753	8 5

APPENDIX 'B'.

Expenditure for period 1st January to 31st December, 1957.

Vote	Service	Amount of Vote	Expenditure	Balance Lapsing
1	Fees to members of Board	250 0 0	128 0 0	121 12 0
7	Spec. allow. Horticulturist	312 0 0	312 0 0	— — —
2.6.8 9.11	Salaries Est. Officers	8,334 0 0	7,789 10 0	544 10 0
10	Spec. allow. T. A. Hollis	400 0 0	400 0 0	— — —
12-14	Salaries Non-Est. Officers	2,640 0 0	2,275 1 7	364 18 5
15	Bonus Est. Officers	799 0 0	736 12 4	62 7 8
16	Bonus Non-Est. Officers	264 0 0	219 12 11	44 7 1
17	General Grant	5,000 0 0	4,967 5 7	32 14 5
18	Control of animal diseases	2,000 0 0	1,383 15 2	616 4 10
19	Control of plant diseases	2,000 0 0	1,947 5 1	52 14 11
20	Horticulture	3,050 0 0	2,991 10 9	58 9 3
21	Govt. House Gardens	3,300 0 0	3,138 8 5	161 11 7
22	Departmental contingencies	400 0 0	376 1 8	23 18 4
23	Packing house supplies, etc.	1,000 0 0	399 16 2	600 3 10
24	Cold storage plant operation	3,500 0 0	3,427 0 5	72 19 7
25	Upkeep and operation of agric. equip. and motor vehicles	4,500 0 0	4,461 13 0	38 7 0
26	Purchase of agric. machinery	3,000 0 0	2,931 4 5	68 15 7
27	Purchase and storage of agricultural supplies	600 0 0	571 5 2	28 14 10
28	Purchase and storage of produce for resale	62,000 0 0	59,115 11 2	2,884 8 10
29	Agricultural Exhibitions	3,000 0 0	3,000 0 0	— — —
30	Biological Control	5,000 0 0	4,552 19 6	447 0 6
31	Reafforestation, etc.	64,000 0 0	62,153 9 3	1,846 10 9
32	Service to citrus growers	3,000 0 0	2,842 6 1	157 13 11
33	Publications	400 0 0	397 4 9	2 15 3
34	Agric. and hortic. ext. work	750 0 0	254 8 3	495 11 9
35	Grant to Arbour Societies	200 0 0	198 0 0	2 0 0
36	Maintenance of school playing fields and parks	4,500 0 0	4,085 19 3	414 0 9
		£184,199 0 0	175,056 8 11	9,142 11 1

APPENDIX 'C'.

Cost of operating Wholesale Marketing Centre.

Salaries of Marketing Officer and Assistant	1,413	15	0
Operation of Cold Storage plant, labour, rent and electricity	5,532	0	5
Purchase of vegetables for resale	57,000	8	10
	£63,946	4	3

Receipts.

Sale of vegetables in 1957	52,396	18	11
Stock in hand, 31st December, 1957	932	9	10
Outstanding accounts, 31st December, 1957	2,965	15	6
	£56,295	4	3

APPENDIX 'D'.

Production of Ground Crops, Animal Products and Livestock Population.

Crops.

Vegetables

Commodity	Area under crop expr. in acres	Avg. yield per acre in lbs.	Total yield in lbs.	Unit Value	Farm Value
Beans	40	4,000	160,000	1/6d.	£ 12,000
Beets	15	8,000	120,000	7d.	3,500
Broccoli	20	2,500	50,000	1/6d.	3,750
Cabbage	52	10,000	520,000	7d.	15,166
Carrots	60	12,000	720,000	8d.	24,000
Onions	15	10,000	150,000	8d.	5,000
Potatoes, Irish	260	10,000	2,600,000	5d.	54,166
Potatoes, Sweet	50	8,000	400,000	6d.	10,000
Tomatoes	43	9,000	360,000	1/4d.	25,800
Miscellaneous	50	8,000	400,000	7d.	11,606
Bananas	130	10,000	1,300,000	8d.	45,000
	735		7,280,000		£209,988

Citrus

Area under cultivation in acres	No. of trees	Avg. yield per tree in dozens	Total Yield in dozens	Unit Value	Farm Value
80	8,000	12	96,000	5/0	£24,000

Lily Bulbs and Flowers

Area under cultivation in acres	No. of bulbs planted	No. of bulbs exported	No. of boxes of flowers exported	Value
17	680,000	NIL	9,708	£34,678

Animal Products

Milk

Total Production expressed in gallons	Value
596,400	£159,040

Meat Products

Beef in lbs.	Value	Veal in lbs.	Value	Pork in lbs.	Value	Poultry in lbs.	Value
78,000	£5,850	22,800	£1,710	245,700	£24,520	150,000	£20,000

Eggs

Expressed in dozens	Unit Value	Value
450,000	5/-	£112,500

Livestock Population

Dairy Animals

Cows	Heifers	Bulls	Total
1067	120	20	1,207

Horses

Farm and Truck	Carriage	Race Horses	Total
60	30	22	112

Pigs

Sows	Boars	Store Pigs	Piglets	Total
400	50	1,300	900	2,650

Goats — 350

Printed in Bermuda
by the
Bermuda Mid-Ocean News